二国間交流事業 共同研究報告書

令和5年4月17日

独立行政法人日本学術振興会理事長 殿

[日本側代表者所属機関・部局]
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1. 事 業 名 相手国: <u>インド</u>(振興会対応機関: ICSSR)との共同研究

2. 研究課題名

(和文) 災害リスク軽減と気候変動適応のための統合フレームワーク

(英文) An Integrated Framework for Disaster Risk Reduction and Climate Change Adaptation

- 3. 共同研究実施期間 <u>令和 2年 4月 1日 ~ 令和 5年 3月 31日 (3 年 0 ヶ</u>月)
- 4. 相手国側代表者(所属機関名・職名・氏名【全て英文】)

Indian Institute of Technology Roorkee

Department of Architecture and Planning Assistant Professor

Pasupuleti Ram Sateesh

5. 委託費総額(返還額を除く)

本事業により執行した委託費総額		1,140,000	円
内訳	1年度目執行経費	0	円
	2年度目執行経費	1,140,000	円
	3年度目執行経費		円

6. 共同研究実施期間を通じた参加者数(代表者を含む)

日本側参加者等	3名
相手国側参加者等	3 名

* 参加者リスト(様式 B1(1))に表示される合計数を転記してください(途中で不参加となった方も含め、 全ての期間で参加した通算の参加者数となります)。

7. 派遣·受入実績

	派遣		亚 7	
	相手国	第三国	安人	
1年度目	0	0	(0)	
2年度目	2	0	(1)	
3年度目	2	0	1(1)	

* 派遣・受入実績(様式 B1(3))に表示される合計数を転記してください。

派遣:委託費を使用した日本側参加者等の相手国及び相手国以外への渡航実績(延べ人数)。 受入:相手国側参加者等の来日実績(延べ人数)。カッコ内は委託費で滞在費等を負担した内数。

8. 研究交流の概要・成果等

(1)研究交流概要(全期間を通じた研究交流の目的・実施状況)

Our research team, in collaboration with the IIT Roorkee, India, conducted the following activities to understand the challenges and potentials of disaster risk reduction (DRR) and climate change adaptation (CCA) :

1. Established Case Study Area: Barsu Village, Uttarakhand, India:

Using field-based and evidence-based methods, this study aimed to provide a practical and comprehensive understanding of the integrated framework for disaster risk reduction (DRR) and climate change adaptation (CCA). The study was conducted in the village of Barshu in Uttarkhand. Landslides and earthquakes are common in the village. Climate change and environmental risks also affect the village. The village common people and village leaders were consulted several times in order to convince them to allow us to collect primary data and make a plan for this village.

2. Risk Mapping and Vulnerability Analysis :

In Basru village, we conducted several field surveys and risk mapping with the help of students and faculty from IIT Roorkee. The field survey and risk mapping enabled us to: (i) locate disaster risks and climate change induced risks in the village; (ii) measure spatial changes caused by the risks; and (iii) identify villagers' coping mechanisms for disaster risks. Based on information provided by local villagers, we developed a map of the village and identified risk-prone areas. Additionally, we mapped the changes and risks that local communities face as a result of climate change. A vulnerability map and index have been developed based on the risk mapping survey.

3. Yonmenkaigi System Method and Action Plan for Basru :

It was not limited to identifying the spatial risks due to landslides and climate change in the area. Using the Yonmenkaigi System Method, we developed an action plan for the villagers. An original version of this method was developed in Japan, and then it was applied in the field study area. More than 30 participants attended the workshop, including villagers, government officials, NGOs, voluntary organizations, local researchers, and students. First, the participants conducted a SWOT analysis to determine the village's strengths, weaknesses, opportunities, and threats in relation to disaster risks and climate change. As a result of the SWOT analysis, the participants of the workshop identified the major issues facing the Barsu village. At the end of the workshop, participants were divided into four groups based on four roles: finance, management, logistics, and culture. To prevent disaster risks and climate change risks, they developed action plans for three months, six months, and two years in all four areas, including management, finance, logistics, and culture. IIT Roorkee's Department of Architecture and Planning hosted the workshop. Participants, including 15 villagers

from Barsu village, attended the workshop at IIT Roorkee. Yongmenkaigi Workshop helped to develop an actionable integrated plan for disaster risk reduction and climate change adaptation

(2)学術的価値(本研究交流により得られた新たな知見や概念の展開等、学術的成果)

This bilateral project has the following academic outcomes -

Journal Paper:

In the IDRiM international journal, we have published one paper.

(i) Kandari, S., Pasupuleti, R. S., & Samaddar, S. (2022). Cultural Systems in Water Management for Disaster Risk Reduction: The Case of the Ladakh Region. IDRiM Journal, 11(2), 28-56.

We are preparing two more papers -

(i) The needs and challenges of the integration of climate change adaptation and disaster risk reduction (Authors : S Samaddar and R.S. Pasupuleti)

(ii) Integrating risk : A pro-people perspective

Conference Presentations:

We have presented our work on integrating CCA and DRR in the following international conferences –

(i) Presentation Title: The reproduction of Vernacular Place in Disaster Risk Reduction and Climate Change Adaptation

Speakers: Ram Sateesh Pasupuleti and Subhajyoti Samaddar

Conference Name: IDRiM (Integrated Disaster Risk Management) Virtual workshop for Interactive Discussions between Seniors and Early-Career Scientists.

Date: 22 and 23 September 2021

Conference Link: <u>IDRiM | International Society for Integrated Disaster Risk Management – Virtual</u> <u>Workshop of the IDRiM Society</u>

2. Presentation Title: Integrating Climate Change Adaptation and Disaster Risk Reduction through culture: Case of Himalayan settlements

Speakers: Sweata Kandari , Ram Sateesh Pasupuleti and Subhajyoti Samaddar

Conference Name: IDRiM (Integrated Disaster Risk Management) Virtual workshop for Interactive Discussions between Seniors and Early-Career Scientists.

Date: 22 and 23 September 2021

Conference Link: <u>IDRiM | International Society for Integrated Disaster Risk Management – Virtual</u> <u>Workshop of the IDRiM Society</u>

(iii) Presentation Title: Integrated Disaster Risk Management: Issues and Perspectives
Speakers: Subhajyoti Samaddar
Conference Name: IDRiM (Integrated Disaster Risk Management) Virtual workshop for Interactive
Discussions between Seniors and Early-Career Scientists.
Date: 22 and 23 September 2021
(iv) Presentation Title : "Community Participation in Disaster Risk Reduction worldwide: Emic and
Etic Perspectives"
Speaker : S. Samaddar and R. Pasupuleti
Conference Name: IDRiM (Integrated Disaster Risk Management) Virtual workshop for Interactive
Discussions between Seniors and Early-Career Scientists.

<u>Conference Sessions</u>: We organized (chaired) two virtual conference sessions in international conferences as follows –

(i) Session Name: Integrating Climate Change Adaptation and Disaster Risk Reduction Session Chairs: Ram Sateesh Pasupuleti and Subhajyoti Samaddar

Conference Name: IDRiM (Integrated Disaster Risk Management) Virtual workshop for Interactive Discussions between Seniors and Early-Career Scientists.

Date: 22 and 23 September 2021

(ii) Session Name: What is your 'IDRiM' – what is your experience of or idea for a collaborative project?

Session Chair : Kaori Kitagawa, Subhajyoti Samaddar

Conference Name: IDRiM (Integrated Disaster Risk Management) Virtual workshop for Interactive Discussions between Seniors and Early-Career Scientists.

Date: 22 and 23 September 2021

(iii) Session Name: Community Participation in Disaster Risk Reduction – Emic and Etic Perspective ?

Session Chair : Kaori Kitagawa, Subhajyoti Samaddar

Conference Name: IDRiM (Integrated Disaster Risk Management) Virtual workshop for Interactive Discussions between Seniors and Early-Career Scientists.

Date: 21 and 23 September 2022

(3)相手国との交流(両国の研究者が協力して学術交流することによって得られた成果)

The bilateral research project conducted by the Disaster Prevention Research Institute at Kyoto University (S. Samaddar) and the Indian Institute of Technology Roorkee (IITR) (R Pasupeuleti) has resulted in the following joint activities:

(i) Jointly organized conference sessions in the international virtual conference:

In spite of our inability to attend the conference physically due to the pandemic, we jointly organized a conference session at the international conference in 2021. I mentioned the details of the conference session in the previous section. The joint session was held at the International Conference on Disaster Risk Management (IDRiM) in 2021.

(ii) Joint Paper Presentation in International Conferences:

During the international conference, Dr. S Samaddar from Kyoto University and Dr. Ram Sateesh from IIT Roorkee made three presentations. Details of the presentations are already provided above. Presentations were made at the International Conference on Disaster Risk Management (IDRiM) in 2021 and 2022.

(iii) Joint papers :

Samaddar (Kyoto University) and Pasupuleti jointly published a paper in IDRiM (Integrated Disaster Risk Management).

(iv) Institute visit and invited lectures:

IIT Roorkee invited Dr. S Samaddar to deliver invited lectures.

Dr. R Pasupeulti spent a long time at DPRI, Kyoto. During his stay at DPRI, he actively participated in discussions about community participation with researchers from DPRI and other Japanese institutions. Pasupelti wrote a draft paper (not yet submitted) about the spatiotemporal integration of CCA and DRR. As part of the Sogo-Bosai Seminar at DPRI, Kyoto University, Dr. Pasupuleti gave an invited lecture on the same topic as well as Yongmenkaigio System Method.

This bilateral project led to a MoU between DPRI, Kyoto University, and IIT Roorkee.

(4)社会的貢献(社会の基盤となる文化の継承と発展、社会生活の質の改善、現代的諸問題の克服と解決に資 する等の社会的貢献はどのようにあったか)

Developing Community's Vulnerability Index and Risk Maps :

This project was not limited to collecting data or accumulating scientific evidence. This project developed a village risk map through participatory risk mapping. Previously, villagers and government officials lacked comprehensive information about the potential threats and risks in the area. Information related to risk was limited and unorganized. Using participatory risk mapping, villagers and their local government were able to identify the areas, properties, houses, and households that are vulnerable and the extent of their vulnerability. It was also helpful to identify possible measures that could be taken in order to reduce the risks in the area.

Action Plan and Self-Reliance

Through the Yongmenkaigi Syemtem Method workshop, we developed an action plan. Local communities can directly benefit from this in terms of disaster risk reduction and climate change adaptation. Risk awareness is critical for disaster risk reduction. However, knowing disaster risks does not directly lead to communities' willingness to prepare for risks or take preventive actions. Taking DRR initiatives in local communities is challenging due to a lack of resources and knowledge. This research project helped local communities to develop an action plan for disaster risk reduction and climate change adaptation. Now, people are not only aware of the risk, but also know how to prevent it. Since they lack financial, organizational, and natural resources to deal with disaster risks, this was more beneficial to local communities. By participating in the Yongmenkaigi System Method workshop, they realized and identified their potential resources and capacity to deal with disaster risks on their own. This process has enhanced the self-reliance of the local communities.

Implementation Science for DRR and CCA

In disaster risk reduction (DRR) and climate change adaptation (CCA), there has been considerable debate about plan implementation. Researchers often fail to put their knowledge into practice. The risk mapping and Yongmenkaigi System Method work is an academic milestone for us in understanding the challenges, process, and mechanism of implementing scientific knowledge into practice. This project enriched our understanding of implementation science for disaster risk reduction (DRR) and climate change adaptation (CCA).

(5)若手研究者養成への貢献(若手研究者養成への取組、成果)

This project relied heavily on young researchers.

1. Based on this project data, we published a paper with a young scientist as the lead author.

- 2. Risk mapping and Yongmenkaigi System Method workshop were led by young researchers including Ph.D. students from IIT Roorkee, India. Thus, young scientists gain knowledge about cutting-edge technologies for disaster risk reduction and climate change adaptation. Researchers were also able to share their knowledge and research findings across countries through the Project. For instance, Dr. Samaddar gave lectures at IIT Roorkee on risk communication, and students from IIT Roorke who participated in the project shared their observations and findings from field surveys.
- 3. Based on survey data, Kyoto University PhD students developed the risk maps.

(6)将来発展可能性(本事業を実施したことにより、今後どの様な発展の可能性が認められるか)

This project enhances several future development potentials:

- A case-study area has been established in Uttrakhand. We can use this community as a living laboratory for our research. Conventional DRR research projects typically end after one or two years and do not continuously monitor the impacts of DRR technologies and actions over time. A case-study area can serve as a living lab for continuously monitoring disaster risk, community coping behavior, and changing risk scenarios in the village. In order to extract real-life data and implement DRR policies, continuous monitoring and action are essential.
- 2. The model we implemented here is a great learning tool for developing a case station for a long-term implementation base for disaster risk reduction. It will also demonstrate avenues for establishing such case stations for practical and implementation-based DRR research in developing countries like India.
- 3. A practical framework for DRR and CCA has been developed. India and South Asia can use this framework as a starting point for integrating DRR and CCA actions and plans.
- 4. IIT Roorkee and DPRI Kyoto University will enhance their research collaboration through the project.
- 5. This project also enhanced the potential for transdisciplinary research on DRR because it brought together engineers, social scientists, architects, and experts in geography and GIS. Transdisciplinary research is critical to phenomena-based research, such as disaster risk reduction.

(7)その他(上記(2)~(6)以外に得られた成果があれば記載してください) 特になし